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EXAMINER	
MATTIS, JASON E	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/038,915	MA ET AL.	
	Examiner	Art Unit	
	Jason E. Mattis	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4-14,16-23 and 57-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2, 4-14, 16-23, and 57-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed 3/15/07. Due to the amendment, the previous objections to claims 11-14 have been withdrawn. Also, due to the amendment, the previous drawing objections have been withdrawn. Claims 1, 3, and 15 have been canceled by the amendment. Claims 2, 4-14, 16-23, and 57-61 are currently pending in the application.

Claim Objections

2. Claims 5, 16, 19, and 22 are objected to because of the following informalities:

With respect to claims 5, 16, 19, and 22, each of these claims contains the phrase "operable to". This phrase generally relates to claim limitations that are not positively stated and may be considered optional. It is recommended that the phrase "operable to" be removed from the claims.

With respect to claim 16, this claim is further objected to because it depends on now cancelled claim 15. It is recommended that claim 16 be amended such that it depends on claim 17.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2, 4, 7-14, 16-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (U.S. Pat. 6473467) in view of Makipaa (U.S. Publication US 2001/0031639 A1) and Mody et al. (U.S. Pat. 7088782 B2).

With respect to claim 10, Wallace et al. discloses a MIMO-OFDM transmitter and receiver transmitting and receiving a header symbol format in which sub-carriers of a header OFDM symbol are divided into a non-contiguous set of sub-carriers for each of a plurality of antennas with each antenna transmitting the header OFDM symbol only on the respective set of sub-carriers **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to assigning disjoint sub-channel subsets to each antenna of a MIMO-OFDM transmitter and receiver for transmitting a pilot signal, which is a header OFDM symbol)**. Wallace et al. does not disclose header symbols containing both a multiplexed dedicated pilot channel and a common synchronization channel. Wallace et al. also does not disclose the common synchronization channel transmitting a different sequence for each antenna of a transmitter but using the same sequences in transmit antennas of different transmitters.

With respect to claim 17, Wallace et al. discloses a MIMO-OFDM transmitter and receiver adapted to transmit and receive a header symbol format in which sub-carriers of a header OFDM symbol are divided into a non-contiguous set of sub-carriers for each of a plurality of antennas with each antenna transmitting the header OFDM symbol only on the respective set of sub-carriers **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to assigning disjoint sub-channel subsets to each antenna of a MIMO-OFDM transmitter and receiver for transmitting a pilot signal, which is a header OFDM symbol)**. Wallace et al. does not disclose header symbols containing both a multiplexed dedicated pilot channel and a common synchronization channel. Wallace et al. also does not disclose the common synchronization channel transmitting a different sequence for each antenna of a transmitter but using the same sequences in transmit antennas of different transmitters.

With respect to claims 4, 12-14, and 18, Wallace et al. does not disclose using a broadcasting channel in addition to a pilot channel and synchronization channel with these channel being repeated in a predetermined order.

With respect to claim 8, Wallace et al. does not disclose the common synchronization channel being designed for fast and accurate initial acquisition.

With respect to claims 4, 8, 10, 12-14, 17, and 18, Makipaa, in the field of communications, discloses an OFDM system using a multiplexed pilot channel, common synchronization channel, and broadcasting channel repeated in a predetermined order **(See page 2 paragraph 31 and page 3 paragraph 37 of Makipaa for reference to using a pilot channel, a synchronization channel, and a broadcast**

channel in an OFDM system, with the synchronization channel being used to quickly acquire synchronization and for reference to these channels being repeated in order after 64 code channels). Using a multiplexed pilot channel, common synchronization channel, and broadcasting channel has the advantage of allowing synchronization and broadcast information to be periodically transmitted to every receiver of the system.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the work of Makipaa, to combine using a multiplexed pilot channel, common synchronization channel, and broadcasting channel, as suggested by Makipaa, with the system and method of Wallace et al., with the motivation being to allow synchronization and broadcast information to be periodically transmitted to every receiver of the system.

With respect to claims 10 and 17, Mody et al., in the field of communications, discloses transmitting a different sequence for each antenna of a transmitter but using the same sequences in transmit antennas of different transmitters **(See column 17 lines 1-18 of Mody et al. for reference to using different training sequences for each antenna of a transmitter, with different transmitters using the same set of training sequences)**. Transmitting a different sequence for each antenna of a transmitter but using the same sequences in transmit antennas of different transmitters has the advantage of allowing training sequence sent from different antennas to be differentiated from each other to provide better synchronization acquisition.

It would have been obvious for one of ordinary skill in the art at the time of the invention, to combine transmitting a different sequence for each antenna of a transmitter but using the same sequences in transmit antennas of different transmitters, as suggested by Mody et al. with the system and method of Wallace et al. and Makipaa, with the motivation being to allow training sequence sent from different antennas to be differentiated from each other to provide better synchronization acquisition.

With respect to claims 7 and 20, Wallace et al. does not disclose pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification.

With respect to claims 7 and 20, Makipaa, in the field of communications, discloses pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification **(See page 3 paragraph 32 of Makipaa for reference to each base station using a different 16-bit base station identifier within a pilot field)**. Using pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification has the advantage of allowing a receiver to quickly determine the identity of the BTS a pilot was received from.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the work of Makipaa, to combine using pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification, as suggested by Makipaa, with the system and method of Wallace et al., with the motivation being to allow a receiver to quickly determine the identity of the BTS a pilot was received from.

With respect to claim 9, Wallace et al. does not disclose using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization.

With respect to claim 9, Mody et al., in the field of communications, discloses using a pilot channel used for fine synchronization and a synchronization channel used for course and fine synchronization **(See column 14 lines 13-22, column 15 lines 23-43, and column 17 lines 1-18 of Mody et al. for reference to performing coarse and fine synchronization using a pilot channel and training sequence, which is a synchronization channel)**. Using a pilot channel used for fine synchronization and a synchronization channel used for course and fine synchronization has the advantage of allowing quick and accurate synchronization.

It would have been obvious for one of ordinary skill in the art at the time of the invention, to combine using a pilot channel used for fine synchronization and a synchronization channel used for course and fine synchronization, as suggested by Mody et al. with the system and method of Wallace et al. and Makipaa, with the motivation being to allow quick and accurate synchronization.

With respect to claims 2 and 16, Wallace et al. discloses using N antennas with the set of sub-carriers assigned to each antenna being separated by N sub-carriers **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to an embodiment using 4 antennas with the set of sub-carries used by each of the four antennas being separated by 4 sub-carriers)**.

With respect to claim 11, Wallace et al. discloses using scattered pilots throughout an OFDM frame **(See column 15 lines 8-36 and Figure 1C of Wallace et al. for reference to using disjointed scattered pilot signals throughout an OFDM frame)**.

5. Claims 5, 6, 19 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of Makipaa and Mody et al. and in further view of Applicant's admitted prior art.

With respect to claims 5, 6, and 19, Wallace et al. discloses transmitting an OFDM preamble having a prefix that is a cyclic repetition **(See column 14 lines 40-55 and Figure 1B of Wallace et al. for reference to appending a cyclic prefix/extension to an OFDM preamble)**. Wallace et al. does not disclose following the prefix with two identical header symbols.

With respect to claims 5, 6, and 19, the Applicant's admitter prior art discloses using multiple identical header symbols **(See page 4 line 18 to page 5 line 6 of the Applicant's specification for reference to using repeated OFDM symbols)**. Using multiple identical header symbols has the advantage of allowing synchronization to be more easily obtained.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the Applicant's admitted prior art, to combine using multiple identical header symbols, as suggested by Applicant's admitted prior art, with the system and method of Wallace et al., Makipaa, and Mody et al., with the motivation being to allow synchronization to be more easily obtained.

With respect to claim 21, Wallace et al. does not disclose pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification.

With respect to claim 21, Makipaa, in the field of communications, discloses pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification **(See page 3 paragraph 32 of Makipaa for reference to each base station using a different 16-bit base station identifier within a pilot field)**. Using pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification has the advantage of allowing a receiver to quickly determine the identity of the BTS a pilot was received from.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the work of Makipaa, to combine using pilot channel sub-carriers having a BTS specific mapped complex sequence for BTS identification, as suggested by Makipaa, with the system and method of Wallace et al., with the motivation being to allow a receiver to quickly determine the identity of the BTS a pilot was received from.

With respect to claims 22 and 23, Wallace et al. does not disclose using a multiplexed dedicated pilot channel used for fine synchronization and a common synchronization channel used for course and fine synchronization.

With respect to claims 22 and 23, Mody et al., in the field of communications, discloses using a pilot channel used for fine synchronization and a synchronization channel used for course and fine synchronization **(See column 14 lines 13-22, column 15 lines 23-43, and column 17 lines 1-18 of Mody et al. for reference to performing**

coarse and fine synchronization using a pilot channel and training sequence, which is a synchronization channel). Using a pilot channel used for fine synchronization and a synchronization channel used for course and fine synchronization has the advantage of allowing quick and accurate synchronization.

It would have been obvious for one of ordinary skill in the art at the time of the invention, to combine using a pilot channel used for fine synchronization and a synchronization channel used for course and fine synchronization, as suggested by Mody et al. with the system and method of Wallace et al. and Makipaa, with the motivation being to allow quick and accurate synchronization.

6. Claims 57-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. in view of Applicant's admitter prior art.

With respect to claims 57-59, Wallace et al. discloses transmitting an OFDM preamble having a prefix that is a cyclic repetition **(See column 14 lines 40-55 and Figure 1B of Wallace et al. for reference to appending a cyclic prefix/extension to an OFDM preamble)**. Wallace et al. does not disclose following the prefix with two correlated header symbols. Wallace et al. does not disclose using two correlated header symbols.

With respect to claims 60 and 61, the Wallace et al. does not disclose following the prefix with two identical header symbols.

With respect to claims 57-61, the Applicant's admitter prior art discloses using multiple identical header symbols **(See page 4 line 18 to page 5 line 6 of the**

Applicant's specification for reference to using repeated OFDM symbols, which are inherently correlated since they contain repeated data). Using multiple identical header symbols has the advantage of allowing synchronization to be more easily obtained.

It would have been obvious to one of ordinary skill in the art at the time of the invention, when presented with the Applicant's admitted prior art, to combine using multiple identical header symbols, as suggested by Applicant's admitted prior art, with the system and method of Wallace et al. and Ma et al., with the motivation being to allow synchronization to be more easily obtained.

Response to Arguments

7. Applicant's arguments with respect to claims 2, 4-14, 16-23, and 57-61 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason E. Mattis whose telephone number is (571) 272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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